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# USSR Report

## CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY



FBIS FOREIGN BROADCAST INFORMATION SERVICE

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## CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

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GENERAL

BILLING PROBLEMS IN REGIONAL COMMUNICATIONS CENTERS DISCUSSED

Moscow LENINSKOYE ZNAMYA in Russian 21 Aug 85 p 2

[Article by A. Troitskiy, staff reporter: "In a Paper Merry-Go-Round. Use of Computers in Regional Communications Center Is Still Far Away]

[Text] Krasnogorsk resident R. V. Movsesov learned something rather strange about himself. It appeared from the bill which he received from the regional communications center that Robert Viktorovich Movsesov communicated with the city of Kharkov at various times of the day, chiefly late at night. On one of the June nights, calls to this city took place twice at the same hour, lasting five and twenty-two minutes, respectively. The most mysterious fact was that the telephone number which Movsesov called at night did not exist in Kharkov. However, the bill which he had to pay was real. Such is the paradox.

The geography of Ye. P. Shvedova's long-distance calls was much richer. In one month she placed calls to Kiev, Kustanay and twice to Bryansk. Yevgeniya Petrovna Shvedova had to go to the regional communications center for explanations, since the amount of the bill constituted a considerable part of her pension.

"Well, we'll check it", sighed the billing operators in response to her complaint. There were sufficient reasons for such sad sighs. Such checking takes many months and sometimes more than a year. Due to long investigations (they even use this terminology), the communications center cannot get out of debts, since the payments of bills are either delayed or not made at all by the subscribers. This results in considerable material expenses. For example, in the first part of July, about 200 complaints by the subscribers went into the paper merry-go-round. This happens every months and every year.

According to R. G. Khorvat, director of the RUS [Regional Communications Center], their RUS has already signed a contract with one of the rayon organizations for automatic billing of long distance calls.

Raisa Grigoryevna Khorvat is very optimistic. I had an impression that the contract was signed shortly before my arrival. However, in reality, the "signed" paper has been on file for two and half years and no action has been taken to this day.

Krasnogorsk RUS has a good reputation in the production and technical administration of communications of the Moscow Oblast. For example, N. I. Cherov, director of the long-distance telephone and telegraph service, is sure that the billing process in Krasnogorsk was automated a long time ago. He stated this so persistently that I would have been under a pleasant delusion had I not found out the day before that this was not so. Evidently, the advertising of Krasnogorsk communication workers of their "progressive undertaking" reached such a level that this "undertaking" became an actually existing practice in the conscience of the management of the administration.

Is Krasnogorsk an exception? Unfortunately, it is not! In the Mytishchinskiy Rayon communications center, the billing is done by the same antiquated method by five operators. They write out bills, investigate complaints and call subscribers who forget to pay their bills. Moreover, operators of the Mytishchinskiy RUS have to make entries in the so-called telephone directories of subscribers. In each of such books, which are of the size of a volume of an encyclopedia, they enter the data on the changes of the subscribers' telephone numbers or addresses. Making these entries, the women sometimes have to work overtime until eight or nine o'clock in the evening.

According to senior operator R. I. Filimendikova, the operators, as a rule, are elderly people. In a year or so they will leave. Who will replace them? You cannot get young girls to work here for love or money. Evidently, it will be necessary to hire a new group of retired people.

In fact, young people do not come to work here, since there is nothing to their advantage to work in communications centers.

RUS director V. I. Slyunin said it is not promising to use an automated billing system in Mytishchinskiy Rayon.

According to V. I. Slyunin, telephones of subscribers in their rayon change often, new automatic telephone exchanges are put into operation, the subscribers themselves often change their residences, in short, the numbers of the telephone exchange are not settled. Therefore, if computers are used, there will be many errors in computer-written bills. It will be possible to use computers in this area only after the network of telephone numbers is fully stabilized, i.e., not before 1990s.

Thus, it is expected that the population of Mytishchinskiy Rayon will stop moving to new areas by the beginning of the next century and this will make it possible to "stabilize" the telephone network and use computers widely. This is a "bold" prediction.

Incidentally, as everybody knows, it is just as simple to enter information about a change of address or a phone number as to record it in an address card file. Moscow, where billing is computer-automated, has 360,000 long-distance calls a day. At that time, 3,000 corrections of addresses and phone numbers are entered in the computer data bank. In spite of this extensive scope of operations, Moscow residents who moved to other locations get their bills on time.

Lyuberetskiy Rayon is the only rayon near Moscow where billing is automated. Six years ago, the local RUS concluded an agreement with the computer center of Mosoblavtotrans which is located near it. A worker of the RUS receives a magnetic tape from SAPU and delivers it to the computer center. Two or three days later, he goes to the center in order to receive the bills and enter address changes of the subscribers in the card file of the computer. The bills are sent to the addresses printed by the computer on the bills. The operators keep only the computer chart in order to monitor the payments.

According to Ya. D. Shnayder, chief engineer of RUS, they had to do that because people did not want to stay on the difficult and boring job. They did not have any time to keep records, write inquiries and accompanying letters. Automation brought immediate results. Formerly, the debts of clients to the communications center exceeded 90,000 rubles. After automation, their debts reduced to one tenth. The personnel turnover also stopped, since the work of the operators became considerably easier. Ya. D. Schnayder said that he cannot imagine how their RUS could function today without billing automation.

Six years ago the operators of Lyuberetskiy Rayon had to write 25,000 bills for long distance calls. Today, residents of the rayon make 75,000 calls a month, three times more, but the operators do not have to do extra paper work and can successfully handle their jobs.

Billing automation in Lyuberetskiy Rayon was started as an experiment. However, you can hear the following even today: "They are experimenting" or "They are working under experimental conditions". In the course of time, their "experiment" became a regular practice as a result of many years of experience. However, other regional communications centers were not and are not in a hurry to adopt their practice, referring to objective difficulties and looking for reasons not to do it and not for the ways how to do it. Unfortunately, directors of regional communications centers follow the principle: if your work is more inferior than before, you could have problems, but it is not required to work any better. Consequently, regional communications centers still have old women working as operators who resigned themselves to the role of insignificant workers.

I studied the thick volumes describing the general plan for the development of telephone communications in the Moscow Oblast. According to this plan, residents of the entire area near Moscow will be able to use automatic long-distance telephone services by 1990. For this purpose, 4 AMTS [automatic long-distance telephone exchanges] will be put into operation: in Moscow, in Solnechnogorsk and in Chekhovo. The AMTS in Pavlovskiy Posad is already operating, and will soon serve twelve cities. Some of them, for example, Yegoryevsk, Orekhovo-Zuyevo, Elektrostal and others, are already connected to it.

However, there are no provisions for automated billing even at the above-mentioned exchanges which are equipped with the latest quasi-electronic type equipment. What is the reason for that?

N. I. Cherov explained that the Central Scientific Research Institute of Communications solved the problem of billing automation technically a long time

ago, but the plan does not have any provisions for the necessary work space or equipment. The solution is to build an oblast computer center or to assign the duties of billing automation to SAPU.

S. M. Babich, SAPU Deputy Director, says that they cannot undertake these functions because they are overloaded with work, do not have enough magnetic tapes for the computer and there is a shortage of billing forms.

... Nobody said that SAPU administrators are not doing anything or there are no difficulties in their work. However, they neither explain nor justify the deficiency in their work: customers' complaints are handled slowly and SAPU's correspondence with communications centers is inexcusably delayed. In the meantime, O. P. Milyukova, senior operator of Krasnogorsk RUS, sometimes opens her safe in order to wipe the dust off magnetic tape spools for the computer which was left to her from the former chief engineer. Olga Pavlovna Milyukova is still hoping for changes to the better.

10233
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TURKMEN COMPUTING OUTLINED

Ashkhabad TURKMENSKAYA ISKRA in Russian 6 Sep 85 p 2

[Article by Kh. Niyazov, "Catalyst for Progress."]

[Text] At the conference on the acceleration of scientific and technical progress held by the Central Committee of the Communist Party of the Soviet Union, much attention was paid to the development of computer technology and the entire informatics industry. Our outside correspondent Kh. Niyazov conducted an interview on the subject of computer service in the republic's economy with Yu. A. Aronskiy, deputy head designer of the republic ASU and department director of the Scientific Research Institute for Economics of the Turkmen SSR Gosplan.

[Question] The wide-spread use of computers in a variety of scientific and technological areas and the appearance of thousands of specialists in computing speaks of growth in the role of computer technology. What can be said of the computer's role in our republic?

[Answer] In his address "The Key Question to Party Economic Policy" at the conference M. S. Gorbachev, General Secretary of the Central Committee of the Communist Party of the Soviet Union, said, "The catalyst of progress is microelectronics, computer technology, instrument-building, and the entire informatics industry. They need accelerated development. Of course, much depends not only on the growth of computer production, but also on the wise use of computers in the economy."

In the area of management, computer technology and ASU's are actually now definitive factors in increased labor productivity. Recent production technology also depends to a significant degree on microcomputers, robot technology, and automated control systems for technological processes based on this technology. The total computer stock is capable of millions of operations per second. Capital investment for ASU rose 1.4 times in the eleventh five-year plan, compared with the tenth. Fifteen automated management systems are operating in the republic. One of the most advanced ASU is the automated system for planning calculations (ASPR) of Turkmen SSR Gosplan, which in its second stage can perform approximately 300 tasks, and the automated system for state statistics, which can now run 23 sets of tasks.

[Question] What does the use of computer technology offer in branches of the economy?

[Answer] Use of computer technology in the area of management makes it possible, for example, to stabilize the number of administrative and management personnel, which, in Turkmenistan, is the highest in the country. Or, in order to manually develop a multivariant balanced state plan design, it would be necessary to increase the size of planning, statistical, and financial bodies by 35-40%. Similar data can be cited for many ministries and departments, enterprises, and organizations.

Another no less important effect is achieved by freeing the worker from routine computations. His work takes on a creative feel. Then it is also possible to more carefully analyze information and look for other, often more balanced, ways to arrive at the best solution. Therefore, the payback for computer technology, compared to other types of new equipment, is much quicker and always amounts to two or three years. One should not forget the so-called social effect of computers in the area of education and culture. Many specialists note that, with the use of computers, a new type of thinking, more productive and creative, appears.

[Question] How is electronic equipment installed and what kind of support is there from the specialists that support this equipment?

[Answer] The first "Minsk-32" type computer appeared in the republic in 1969. During the ninth five-year plan, the computer stock increased to around two dozen machines. During this time, the most difficult problem in Turkmenistan was probably personnel. For all practical purposes, there were no systems analysts or programmers. Technical maintenance and computer operations were very difficult. However, a solution was found: specialists began to be educated right in the computer center itself and in a number of the country's central higher educational institutions.

[Question] We face the necessity of widely using computers in the school system: grade schools, higher educational institutions, and technical schools. What are we doing to that end?

[Answer] A program is being developed to install computers in secondary schools. In this regard, teachers are being trained and retrained by the Republic Institute for Teacher Training, and special computer classes are gradually being instituted in grade schools and secondary schools. Another way of training school children is to conduct classes right in the computer center.

In recent years, the republic's higher educational institutions have begun to be better equipped with various computers, as well. A specialized microcomputer laboratory with four advanced "Iskra-226" machines has been set up at the Turkmen Institute of Economics. These machines are used for practical and laboratory exercises, as well as for solving certain scientific research problems.

In the course of the Twelth Five-year plan, educational-industrial consortium centers will be equipped with computers. The educational-industrial center of the Ashkhabad Proletarskiy Region already has the use of a computer for educational purposes. It is installed in school No 19.

[Question] Please tell us how pocket computers help specialists of various professions?

[Answer] First of all, microcomputers, as they are correctly called, help to quickly and accurately make necessary computations. But there's more. These computers can serve as archiving devices, with thick paper volumes residing on one small cassette. Finally, a small computer is a handy device for the office, often replacing duplicating facilities.

[Question] Please say a few words about the new interschool computer center.

[Answer] A republic interschool computer center opened last year as a part of the Ministry of Higher and Specialized Secondary Education. One of its main tasks is to improve the educational level of students from various higher educational institutions by using computers in the educational process. Another task is the development and gradual introduction of an automated system for high school management

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USE OF COMPUTERS IN TURKMEN VUZES

Ashkhabad TURKMENSKAYA ISKRA in Russian 1 Sep 85 p 3

[Article by B. Ovezov, First Deputy Minister of Higher and Secondary Specialized Information, "To Improve VUZ Science."

[Text] VUZ sciences and computer use are important reserves for the acceleration of scientific and technical progress. Large contributions to both basic and applied sciences are made by the VUZ scholars of our republic. Joint studies are carried out by the TuSSR Academy of Sciences and branch scientific research institutes. The total amount of plan-stipulated work this year is 800 thousand rubles. A considerable sum is received by the Turkmen Polytechnical Institute and the Turkmen State University imeni A. M. Gorkiy. An especially large amount of the plan-stipulated work is done by the Turkmen Polytechnical Institute.

The other important reserve for the acceleration of scientific and technical progress is the widespread use of computer technology.

The Minvuz [Ministry of Higher and Secondary Specialized Education] of the republic places much emphasis on this matter. For the purpose of bringing the training of construction specialists more closely to a modern scientific and technical level of construction production, much emphasis has been placed on instilling the habit of using the computer in the independent work of future construction engineers and architects at the Turkmen Polytechnical Institute. Thus, in the course "Structural Mechanics", sections were introduced with respect to the use of matrix computational methods, which are gaining wide dissemination in connection with the introduction of the computer into design practice. At the Turkmen Institute of the National Economy, the theme "Possibilities, the use of microprocessors and microcomputers in economics and administration" was included in the work plan of the subject "Automated management systems."

Demonstration classes based on the interactive computer facility DVK-2M will be established at the universities of the republic.

At the Minvuz of the republic, the Republic Inter-VUZ Computation Center (RMVTs) was organized to obtain orderly direction and practical assistance for mastering computer technology. An inter-VUZ council for information

science, automated data management systems, and computer technology was formed. RMVTs courses were organized and are functioning for teaching the basics of information science to secondary school teachers and to instructors of secondary specialized education institutions.

The training of personnel in the areas of computers, microprocessor technology, and computer-assisted design systems will be carried out by means of profiling (specialization) the special skills already available at the educational institutions. Specialization can be accomplished in accord with the recommendations of the USSR Minvuz by the introduction of special courses appropriate to the requirements of the certification ratings of the specialists and by the creation of such specialized departments as "Economic cybernetics" and "The application of computer technology in the national economy" at the Turkmen Institute of the National Economy; "Technical cybernetics" at the Turkmen Polytechnical Institute; and "Theoretical cybernetics" at the Turkmen State University imeni A. M. Gorkiy.

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# MULTIPROCESSOR SYSTEMS WITH DYNAMIC REDISTRIBUTION OF REQUESTS THROUGH COMMON BUS

Leningrad PRIBOROSTROYENIYE in Russian No 3, March 85 (manuscript received 10 May 1984) pp 33-38

[Abstract] The reliability of microprocessor control systems can be improved if each unit can retain partial capacity in the case of processor failure such that requests for functions can be dynamically rerouted to other operating processors. Data exchange is through the system bus whose capacity is a primary limiting factor when request distribution time is compatible with the time necessary for the processor to carry out the operation. Realizing this method requires adding 5-10% more complexity in the microprocessor unit. Additional programming can realize the address of another unit to carry out the request. The problem is relevant in systems in which large data volumes are transmitted on a single bus over great distances. A method is presented for evaluating the throughput capacity of the main bus which determines the redistribution possibilities as well as the probability of effective operation of a multiprocessor system without failure if functions can be redistributed. The level of reliability of the dynamic redistribution system is analytically compared with that of a system in which a failed element is simply switched off and evaluations are made showing the marked superiority of dynamic redistribution. This effectiveness is shown to increase as the number of functions rises and processor complexity becomes greater.
[349-12497]

ISKRA-226 PRAISED

Moscow IZVESTIYA in Russian 2 Oct 85 p 2

[Article by Academician Ye. Velikhov, "Intensifiers of Intellect," under the rubric, "Seeking the USSR State Prize."]

[Text] In the early stages of the scientific and technical revolution, the attention was mainly on the problems of automating physical work. Today, first and foremost are the problems of automation in nonproduction areas, that is, the work of scientists and designers and of management personnel in different branches of the national economy. In the opinion of many researchers, this expands the power of our intellect, just as the Industrial Revolution multiplied the strength of our muscles.

A leading role in the solution of problems designed by the Party with respect to the acceleration of scientific and technical progress is assigned to computer technology and computer-based automation. Thus far there has been definite gap between the large group of computer users and the computer facilities. Programmers, electronic technicians, and operators usually must be enlisted by users.

A vicious circle emerges: as a rule, computer specialists are not competent in the areas where computers are applied, and the specialists in specific branches of the national economy cannot work with the computers by themselves. The need for intermediaries created a psychological barrier between the users and the computer, which increased the difficulty of mastering the methods of working with the machines, as well as the size and power consumption of the computer itself.

The solution to these problems is the creation of so-called personal computers. In the USSR, machines in the "Iskra-226" series belong to this class of computers with which the user himself can work. In recent years a number of organizations of the USSR Academy of Sciences, USSR Minpribor [Ministry of Instrument Making, the Means of Automation, and Control Systems], and USSR Gosplan were involved in the creation of such minicomputers with the aim of automating the areas of planning, management, and scientific research. This work was carried out with the close cooperation of the developers and the future users of professional minicomputers at all stages of production and implementation. At the present stage of development of the national economy, the "Iskra-226" series of minicomputers makes it possible to solve

efficiently many problems of the acceleration of scientific and technical progress in planning and management, as well as in chemistry, biology, geology, sociology, communication, public health care, etc.

The first group of the new computers was installed at the USSR Gosplan and at organizations of the USSR Academy of Sciences. In a short time, thousands of economic-planning problems for yearly, five-yearly, and longer range planning at the USSR Gosplan and the gosplans of Union republics were solved using the "Iskra-226" computers. At the USSR Academy of Sciences at chemical-biological specialty institutes, model automated systems were produced for carrying out physical-chemical studies. An All-Union biopolymer structure bank was set up on the basis of the "Iskra-226" computer. Experience with the use of many similar automated complexes demonstrated their high efficiency.

The high quality of the "Iskra-226" computers, produced in series since 1981, has resulted in their use in all areas of the national economy. The computer performs a wide range of operations. These include the production and editing of textual documents, the drawing of graphs and the drafting of drawings, the search and storage of information, the automation of data collection, and the control of production processes and scientific experiments.

The "Iskra-226" series machines are equipped with widely different peripheral equipment and interfacing means, which permits operation in complexes involving measurement instruments, experimental and industrial setups, and other computers. The "Iskra-226" minicomputer is relatively inexpensive.

The table-top design of the machine layout makes it possible to locate it directly in the workplace of the user. No special ambient conditions are needed and the normal electrical system serves as the power source.

The use of the new machines immediately begins to yield appreciable benefits. Thus, for example, at the Glebov Poultry Farm Association the economic benefit of introducing the machines was around 300 thousand rubles for the first year alone.

The work with respect to the creation and introduction into the national economy of the problem-oriented "Iskra-226" series of interactive minicomputers fully merits its advancement to the USSR State Prize Competition.

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# THE TEMP--A PIPELINE PROCESSOR FOR BENCH TEST AUTOMATION SYSTEMS

Kiev KIBERNETIKA I VYCHISLITELNAYA TEKHNIKA DISKRETNYYE SISTEMY UPRAVLENIYA No. 67 in Russian 1985 (signed to press 14 May 85), (Manuscript received 20 Jan 84), pp 97-102

A. A. PETROVSKIY, A. N. TSYRUL'NIKOV, and YE. B. SAMOYLOV, Minsk Radiotechnical Institute

[Abstract] This study examines the architecture and operation of the high-output TEMP special-purpose process for bench testing. The processor employs pipeline structure, and generates an r-dimensional vector random process with the required spectrum matrix. The TEMP processor is based on a matrix multiplier module, a dual FFT arithmetic processor module, a noise generator module, and a buffer memory module. The basic technical specifications are as follows: Dimensionality of random process r=3 in 0.5 kHz band; digitization rate f=20 kHz; time to form one realization with N=1024 samples of three dimensional vector process--50 msec; 6 frequency bands with 512 variable spectral samples in each component of matrix formed; buffer module capacity 8 k 17-bit words; FFT arithmetic processor word length 17 bits; basic execution time 4.8$\mu$sec. The system is based on K155 and K131 series microcricuits, with microprogram control within modules. Figures 4, references: 4 Russian. [29-6900]

NEW COMPUTER SYSTEM 'RIFMA' DESCRIBED

Moscow MOSKOVSKAYA PRAVDA in Russian 11 Sep 85 p 1

[Article by F. Danilovskiy:"'Rifma' Plus Computer"]

[Text] A vast amount of scientific and technical information is published every year in our country. Propectuses, catalogs and materials from symposiums help specialists of enterprises and institutes in developing new equipment. The total number of such publications amount to millions of copies. Naturally, this requires large amounts of paper, not to mention the difficulties with the storing of documents.

The original computer system "Rifma-2" [Rhyme-2] developed by the scientists and engineers of the special design bureau of the All-Union Institute of Scientific and Technical Information is capable of solving these problems. It records the text on a photographic film and increases the output of technical information using an advanced "paperless process". It uses microfilms and microfiches instead of catalogs and brochures which take up much space in libraries. A microfiche is a sheet of film of the size of a notebook. Two pages of a printed text can be put on it. Volumes of reference literature recorded on microfiches appear on them as a column of charts of the thickness of a match box. "Rifma" improves the quality of the text written on them. It will be useful also to editors, speeding up the process of the preparation of manuscripts and publication of various materials.

Just as the rhyme in a literary work arranges the images and generalizations of the author in a harmonious poetic series, "Rifma" in the publishing business is capable of making any text clear and expressive. It is based on the modern microcomputer "Elektronika-60 M". It processes the data rapidly and efficiently, and the results are shown on a display screen which looks just like the television screen. It reproduces the text of the future microfilm or parts of it. The editor with the aid of this display can prescribe the necessary format of the publication, the type to be used, or to italicize or underscore line. Incidentally, the computer will suggest to the editor which type will be best suited for one or another text and how to arrange correctly a table or a chart in the film frame. The computer has a set of 400 symbols of types. It prints them with a fantastic speed of 300,000 per minute, filling 2,800 pages of a manuscript an hour in a microfilm!

By using the computer language, it is possible not only to prescribe it a particular program, but also to read on the display screen computer's suggestions about possible errors in the text. In the "Rifma" system, the computer has become, as specialists say, "an intellectual terminal" capable of performing "creative" work as prescribed by the editor. However, the main purpose of this system is the production of microfilms. Therefore, it is equipped with a universal recording photographic camera which photographs these films. Moreover, the headings of the frames are automatically recorded. Its maximum capacity is 64 lines of text, and a standard cassette, for example MP-16, has more than 2,000 frames. It is quite sufficient to record a whole book on it.

If it is necessary to transfer the text from microfilm to paper, the computer does it without any delay. All the data from the microfilm are recorded in its memory on a magnetic tape. It is possible also to connect a phototypesetting machine "Kaskad" to "Rifma", thus obtaining a complete polygraphic system for publication from the editing of the manuscript to the publication of a book or a brochure.

Moreover, this process is considerably accelerated with the aid of the computer when it, wherever necessary, italicizes or uses a different type for part of the text, moves it to the left or to the right, or will begin the manuscript with a new line. Moreover, the computer can find and show on the display screen in just a few seconds the necessary line or the heading of the frame of the microfilm. On command of the editor, the computer can easily enlarge it or make a copy of any frame on paper.

Tests of the "Rifma-2" system have shown its high effectivenes and universality of its use. It can be used at All-Union and sectorial centers of scientific and technical information and at large publishing polygraphic combines. It will be useful also in industry. Being connected to an automated control system of an enterprise, association, or an entire sector of the national economy, "Rifma" will make it possible to solve urgent problems of the acceleration of the preparation and publication of various technical information.

In the publishing business, this computer system will make it possible to increase the labor productivity of editors and polygraphic workers and will contribute to an increase in the number of copies of books which the readers like.

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# EVALUATION OF THE EFFECTIVENESS OF THE FUNCTIONING OF AN ADAPTIVE MULTIPROCESSOR SYSTEM

Kharkov AVTOMATIZIROVANNYYE SISTEMY UPRAVLENIYA I PRIBORY AVTOMATIKI VYPUSK 69 in Russian 1984 (signed to press 30 Dec 84) (manuscript received 17 Mar 81) pp 81-86

GANITULIN, A. KH., candidate of technical sciences, CHUMAK, A.I. and ROMANKIV, I.V.

[Abstract] A procedure is presented for evaluating the effectiveness of multiprocessor control systems subject to random processor failures. A system is considered consisting of four identical processors of which three are operating and the one is in reserve. There is a hardware monitoring facility which determines whether a unit is operational and there is an operating system consisting of a set of system programs which are realized on one computer while two others control objects. The system is operational if the control unit and one or two other processors are in working order. When a failure occurs a system reconfigurator in accord with an adaptive algorithm inserts the reserve unit. If the control unit breaks down its functions can be assigned to another central unit. A model is formulated for independent failures and system adaptations involving reconfiguration times and evaluations of possible system states. The functioning of the system is described by a homogeneous Markov process and probabilities for transitions from state to state and for operational effectiveness are analytically developed. The model was realized on a M-222 computer and the results were satisfactory for the adaptive system considered and for systems in which there is no adaptive response in the case of failure. The results are summarized in a graph showing the probability for the system to remain operational as a function of failures, restorations and adaptive switching time and the marked superiority of the structural adaptation design is clear.
[405-12497]

UDC 681.34

STRUCTURE AND SOFTWARE OF SPECIALIZED TWO-LEVEL HYBRID COMPUTER SYSTEM

Kharkov AVTOMATIZIROVANNYYE SISTEMY UPRAVLENIYA I PRIBORY AVTOMATIKI VYPUSK 69 in Russian 1984 (signed to press 30 Dec 84) (manuscript received 29 Sep 82) pp 75-81

SENCHENKO, H.I., candidate of technical sciences, PAN, N.P. and OZHOGOV, A.V.

[Abstract] A hybrid computer system consisting of 1-16 AVK-31 or AVK-32 analog computers, a high-level YeS-1022 digital computer and a low-level SM-1 process control computer is used for high precision modelling of dynamic systems, analysis of algorithms for production control systems and for training. There is an interface block consisting of analog/digital and digital/analog converters between the SM-1 block and the analog units. The digital computer and the control unit are linked by the digital machine's selector channel and A 711-1/6 interfaces built into the control machines. The two-level hybrid architecture makes it possible to increase the productivity of the digital part through on-line transmission by the control processor between the analog and digital parts and this significantly increases the system's modelling capacity. In modelling dynamic systems the SM-1 control computer automatically realizes switching of the decision circuits, coefficients and parameters of the analog part and implements dialogue mode while the digital part prepares tasks for solution, controls processes and manipulates data according to the solution algorithm, analyzes and records results and monitors and tests circuits. The hybrid unit programming includes an automated analog programming system which prepares tasks and represents the problem in the appropriate modelling language and synthesizes a flowchart. There is also an automated hybrid programming system which prepares for analog/digital modelling and apportions tasks amongst the analog and digital parts. These systems are in the continuous system modelling language CSMP. Interactive programming allows hybrid computations to be carried out on terminals other than those of the YeS unit. The hybrid operating system (monitor routines, interrupter and dialogue debugging facilities) is described. It can allocate control tasks to the high-level YeS or the low-level SM-1 computers and the programming is usable on other hybrid systems. As an example, the modelling is described of the differential equations describing automobile suspension reactions which are used for the computer-aided design of these parts.
[405-12497]

UDC 621.92:669.71

OPTIMIZATION OF GRINDING MODES FOR COMPUTER MEMORY DISC PLATTERS

Moscow IZVESTIYA VYSSHIKH UCHEBNYKH in Russian No 2, Feb 85 (manuscript received 17 Oct 84) pp 141-143

TERESHCHENKO, L.M., candidate of technical sciences, reader, and OVCHINIKOV, A.I., researcher

[Abstract] The method now used for finishing platters for magnetic discs is diamond turning which requires special equipment and training and is not

always satisfactory for large capacity discs. At the Moscow Higher Technical School imeni N.Ye. Bauman a process was developed using an expanded-polyurethane instrument which does not require complex equipment or skills and produces discs with high dynamic parameters. The finishing operation can be automated and integrated into the disc manufacturing process. The abrasion tool is fixed by vacuum and turns on the disc. To determine the best grinding operation modes two grinding wheel compositions were tested, one with high connection strength and low graininess, the second with significantly less connection strength and greater graininess. The effect of circular velocity and grinding pressure on the dynamic qualities and surface roughness of the disc were studied and it appears that the pressure of the grinding wheel is the most important factor affecting parameter quality. The harder grinding material is therefore preferable although higher wheel velocity which has a lesser positive effect on the result is more suitable with the softer material. Various configurations of factors connected with the two types of material are considered and can be applied for selecting the best combinations for specific situations. The softer material is suggested for preliminary processing and the harder for finishing.
[371-12497]

UDC 528.711.7

DISTORTIONS DURING DEFLECTION OF ELECTRON BEAMS

Kharkov AVTOMATIZIROVANNYYE SISTEMY UPRAVLENIYA I PRIBORY AVTOMATIKI VYPUSK 69 in Russian 1984 (signed to press 30 Dec 84) (manuscript received 12 Feb 82) pp 112-120

GALAT, A.B., GNAP, A.K., candidate of physical-mathematical sciences, DUBROVIN, Yu. V. and SHEIN, A.G., doctor of physical-mathematical sciences

[Abstract] Cathode ray tubes (CRT) are used for data representation whose precision and reliability depend significantly on distortions produced by the electron beam. Accurate performance occurs when the transverse beam shape is not distorted during focusing by deflection plates as is the case when the deviation angles are small while for larger angles the information is distorted. The paper considers aberrations of second and higher orders for the beam deviation systems used in CRT. Equations are developed to describe aberration constants for electrostatic beam deviations in two perpendicular directions and to evaluate the effects of the two directional deviation systems when there are several such systems located one after the other. The physical system considered is a series consisting of the first horizontal deflection plates, the first vertical deflection plates, mask, the second vertical deflection plates, the second horizontal deflection plates and the target. The space charge is not taken into account. An ideal axial trajectory is formulated and equations are developed for the two deviation field intensities on which depend the angle of the beam and its intersection with the target area. An appendix develops equations for the coefficients of aberration from the field intensity equations. The distortions for

deflections in two directions are analyzed into families of eliipses forming comas (astigmatic aberration shapes), curves producing a radial enlargement of beam diameter and positive (cushion-shaped) and negative (barrel-shaped) distortions. The equations make it possible to determine transmission error and by varying the geometry of the deviation plates and the linear dimensions of the system to adjust the coefficients of aberration. Since additional factors affect real systems, computations for actual equipment were not taken into account.
[405-12497]

UDC 002.2.001.5:510.5

# REAL-TIME ALGORITHM FOR ESTIMATING PARAMETERS OF DOCUMENT INFORMATION SYSTEM

Moscow NAUCHNO-TEKHNICHESKAYA INFORMATSITA SERIYA 2 INFORMATSIONNYYE PROTSESSY I SISTEMY in Russian No 7, Jul 85 (manuscript received 1 August 84) pp 13-16

BELOVA, V. N. and MAKSIMOV, V.V.

[Abstract] A recursive algorithm is described for estimating the parameters of a document information stream based on an optimal discrete Kalman filtering algorithm and the state vector expansion method. The Kalman filtering algorithm provides unbiased, accurate estimates of the state of a discrete dynamic system when a Gaussian Markov state sequence is observed against the background of independent Gaussian random vectors. The proposed algorithm employs "prediction correction", i.e., each corrected term is added to the predicted term obtained by extrapolating the preceding estimate one step ahead. The problem of estimating the number of documents in an average stream and its rate of increase is analyzed as an example. The algorithm is found to be computationally efficient; however, it requires a priori information about the statistical characteristics of the random stream and the initial estimate of the average stream. Figures 1, references 11: 8 Russian, 3 Western. [439-6900]

PROGRAMMING PACKAGE DESERVES PRIZE

Moscow IZVESTIYA in Russian 21 Sep 85 p 3

[Article by B. Naumov, academician of the USSR Academy of Sciences, director of the Institute of Informatics Problems, "A Program for Robots," under the rubric, "Seeking the USSR State Prize."]

[Text] The use of computers in the control of production processes and the automation of design is now determining the growth rate and continual improvement of the economy. A new branch of industry, industrial informatics, has combined in itself hardware as well as the software for its operation.

If one is to analyze the development of informatics in our country during the last twenty years, a serious lag in the growth rate of software compared to the development of electronic and computer hardware is quite noticeable. The complexity and variety of tasks demand an ever-larger quantity of the most varied software. Hundreds of man-hours are spent on software development by traditional means, whether it be for computer-aided design systems or automated control systems. Being a means for improving labor productivity in various spheres, industrial informatics itself is in need of greater programmer productivity.

The scientific conception formulated by B. Tamm, academician of the Estonian SSR Academy of Sciences, and Yu. Pruuden, candidate of the technical sciences, concerning the integrated use of software systems with a variegated problem orientation and the principle of creating applications system software package configurations by means of systems of programming tools, have become a sort of compass in the labyrinth of informatics. The research of E. Tyugu, corresponding member of the Estonian SSR Academy of Sciences, has had a great effect on the creation of the new technology for developing applications program packages. This as well as other fundamental theoretical research have made it possible for the scientists at the Estonian SSR Academy of Sciences' Institute of Cybernetics to develop two families of systems of programming tools, "Priz" and "Memo". These systems have already received wide-spread recognition and dissemination as tools for industrial informatics in the electrotechnical and machine industry, in scientific organizations and educational institutions, and in construction design bureaus.

The work of the team of scientists at the Estonian SSR Academy of Sciences' Institute of Cybernetics, "The Creation and Implementation of Configurations of Systems of Programming Tools for Engineering and Technical Problems", without a doubt deserves the USSR State Prize.

12713/9716
CSO: 1863/24

UDC 002.6:681.2:389.14

# FORMATION OF DATA BASE FOR METROLOGICAL SERVICES OF MINPRIBOR

Moscow IZMERITELNAYA TEKHNIKA in Russian No 6, May 85 pp 65-67

ZOTOV, A.G., GOLOVASHKIN, M.A., KLOCHKOV, M.M. and SHERSTYUKOV, H.G.

[Abstract] The Ministry of Instrument Making, Automation Equipment and Control Systems (MINPRIBOR) is developing a sectoral metrological service which defines the organizational and methodological bases of metrology for design, production, and operation of goods. The project involves a large quantity of data of various types concerning production quality, reliability, efficiency, characteristics, etc., and the Scientific Research Institute for Instrument Standards (NIIstandartpribor) is developing an automated Metrology block with its data base which forms part of the institute's automated control system. The storage part of the Metrology block consists of three centralized files: sectoral list of measurement equipment (SI); metrological service data sheets; and data about test units and equipment. The sectoral list file covers MINPRIBOR equipment which has been tested and accepted for series production, and is formed from machine-oriented forms giving particulars for SI. An automated system for metrological services (ASMO) has been introduced into many enterprises and is linked to the SI file showing available equipment and services. The metrological service data sheet file contains data concerned with the components and activities at enterprises using metrological services. The test units and equipment file contains data on test units, operations, user requirements and rationalized distribution of equipment. The aggregate parametric data in the files describing the equipment gives an adequate picture of operations and effectiveness. The data system is realized on a YeS computer with YeS 7920 and YeS 7906 terminals. The programming is compatible with the YeS 6.1 operating system (or more advanced versions) and uses the Spektr relational-network data base management system. One or several terminals can operate in dialogue mode and searches can be made for required instrumentation configurations. Hard copy is available from alphanumeric printers.
[348-12497]

UDC 658.512.2:681.2

MAN-MACHINE PROBLEMS IN DEVELOPMENT AND OPERATION OF COMPUTER-AIDED DESIGN SYSTEMS

Moscow PRIBORY, SREDSTVA AVTOMATIZATSII I SISTEMY UPRAVLENIYA: OPYT KHUDOZHESTVENNOGO KONSTRUIROVANIYA V PRIBOROSTROYENII in Russian No 15 (signed to press 8 Jan 85) pp 19-26

IRUGOV, B.S. and PARADIZOV, N.V.

[Abstract] Human factors engineering of computer-aided design systems consists in ascertaining and classifying the man-machine interactions, efficiently distributing the functions among the machine and human components and coordinating their joint operation in an efficient manner. This paper discusses the ergonomic aspects of the construction of a computer-aided design system for printed circuit board. The 14 ascertained operations performed by the human operator in the design of a board are analyzed in order to rank the importance of the work station components in terms of the volume information handled, the duration of each operation and degree of influence on an operation on designer fatigue (visual, aural, physical and psychological). The optimal work station structure is sketched for the case of right-handed operators. The hardware ranked as most important is located in the optimal field of view (50 to 60° sector in front of the operator); the most important displays must be placed at the level of the designer's eyes or lower; the distance of the displays from the designer's eyes must be 400 to 500 mm. The trapezoidal shape of the observation plane must have the optimum angle between the side panels and the frontal plane of 105°. In order to reach characters from a display, the horizontal plane viewing angle must be 50 to 60° (the maximum permissible is 90°). A typical configuration is drawn and consists of a plotter, the design specifications engineer, display console graphics data input unit, printed circuit board designer and a control computer. The ergonomic design of such work stations for printed circuit boards is shown to require mathematical optimization techniques. Figures 6. [37-8225]

UDC 681.3.069

MICROPROCESSOR REALIZATION OF TREE ALGORITHM FOR RECOGNITION

Leningrad PRIBOROSTROYENIYE in Russian No 3, March 85 (manuscript received 23 Nov 1981) pp 38-41

KLISTORIN, I.F., PUSHNYAK, Yu. A. and SHEVCHENKO, G.Ya., Kishinev Polytechnical Institute imeni S. Lazo

[Abstract] Tree-type structure algorithms for pattern recognition and diagnostics usually require considerable computer resources and can be used only on large computers. A solution is proposed in which a realization usable on

microprocessors is previously developed on a large computer. The process consists of establishing a decision rule for specific objects based on a graph method in which a recognition tree is formed during a learning period during which appropriate characteristics (variables) are selected from an initial set. The tree can be tested to see whether it conforms to the object and redesigned if necessary. The memory for the microcomputer is then programmed on the large computer as an assembly program which can be used on the microcomputer. The algorithm for the recognition procedure is described and is universal while the recognition tree varies depending upon the object and a storage map is shown illustrating the permanent and variable features. The hierarchical structure can be realized on almost any type of microprocessor. The system has been effectively used on microprocessors and is applicable for many monitoring, diagnostic and pattern recognition tasks.
[349-12497]

UDC 651.926:681.3:801

## SEMANTIC MODULES IN MACHINE TRANSLATION SYSTEM

Moscow NAUCHNO-TEKHNICHESKAYA INFORMATSIYA SERIYA 2 INFORMATSIONNYYE PROTSESSY I SISTEMY in Russian No 7, Jul 85 (manuscript received 20 June 84) pp 29-34

BELYAEVA, L.N., MATORINA, L. V., PIOTROVSKIJ, R. G. and YASHCHENKO, T.V.

[Abstract] A semiotic analysis is made of the matrix-frame and thesaurus network translation method for word combinations in technical text. In the matrix-frame analysis method, the combination rules for lexical units that form terminological word combinations are taken from the dictionary entry for each word form and put in standard frame patterns, where one of the frames represents patterns that reflect different semantic and syntactic construction schemes for the input word combination employed in the relevant area of knowledge. The design and operation of a matrix-frame filter is examined using the example of translating combinations pertaining to the subject area of oil and gas storage. The thesaurus-network procedure combines the valence method, which is based on consideration of the permitted combinability of semantic features of word forms comprising a terminological word combination, and analysis of the word combinations with the help of a branch thesaurus. The application of the thesaurus-network approach is demonstrated by the example of word combinations from the subject area of computer systems. The thesaurus-network filter procedure is found to be independent of the structure and number of elements in the particular word combination, which makes it universal. The matrix-frame approach is advantageous in that the nomenclature of all possible elements in relationships between them are assigned, which makes it possible to recognize the value of the components of the terminological word combination fairly rapidly. The thesaurus-network approach does not require a priori explicit explication of all possible elements of the word combinations and connections between them. Figures 4, references: 8 Russian.
[439-6900]

IMPROVING OPERATING EFFICIENCY OF INFORMATION SYSTEMS BY EMPLOYING RELATIONAL DATA BASE MODEL

Baku NARODNOYE KHOZYAYSTVO AZERBAYDZHANA in Russian No 6, Jun 85 pp 42-47

KASUMOV, F. G., IMRANOV, A.M., and MELIKOVA, B. K., AzNIINTI

[Abstract] A relational approach to structuring the AFIPS (computerized information retrieval system) data base is described, although it is never made clear if it has been applied in practice. The AFIPS is a subsystem of the Azerbaydzhan Republic Computerized Scientific-Technical Information System, and itself is made up of four subsystems to support economic management and planning entities as well as specialists within the republic by acquiring, storing, searching, and outputting information, and providing on-line user access to the data base from interactive terminals. The use of relational structuring of the data base makes it possible to avoid opening and closing subfiles frequently, to access the required data block rapidly, to avoid rigid connections between the identifying key and the address of a record in a block, and to locate the blocks of the same subfile arbitrarily in peripheral memory.
[455-6900]

UDC 518.5:519.2

REALIZATION OF COMBINED METHOD FOR GENERATING RANDOM VIBRATION PROCESSES ON IVK-3 (SM-4 GENERAL-PURPOSE COMPUTER)

Kiev KIBERNETIKA I VYCHISLITELNAYA TEKHNIKA DISKRETNYYE SISTEMY UPRAVLENIYA No 67 in Russian 1985 (signed to press 14 May 85), (manuscript received 1 Jan 84) pp 107-112

SALIVONOV, Ya. M. and NIKITENKO, A.S., Institute of Cybernetics imeni V. N. Glushkov, Ukrainian SSR Academy of Sciences

[Abstract] A method is proposed for improving the accuracy of reproduction of the spectra of vibration processes modeled with the help of a stationary normal random process, and for realizing the procedure in a vibration testing control system. A combined statistical model of vibration processes is developed and analyzed. The flow chart of the algorithm for generating realizations of the random sequence by the combined method is represented. The use of the system to generate random vibrations in a one-dimensional vibration testing control system confirmed the validity of the proposed approach. Figures 3, references: 8 Russian.
[29-6900]

UDC 519.86:681.5

DEVELOPMENT OF A FORMAL ALGORITHM FOR DESIGNING OPTIMAL PLAN FOR MACHINE-BUILDING PLANT COMPUTER CENTER

Moscow IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY in Russian No 2, Feb 85 (manuscript received 17 Oct 84) pp 132-135

YAKOLEV, P.P., engineer

[Abstract] The planning of the use of computer center machine time in large machine-building plants involves long-term (years to weeks) and short-term (days) periods. Tasks are classified as periodic, scientific and operational and the problem considered is to organize task aggregates in long-term plans using specialists of various levels (plant: program complexes; units: specific tasks; computer center) and allocation of computer facilities in an appropriate way. For simplification, the proposed model considers the overall problem as consisting of periodic and scientific tasks requiring significant machine time. A formal algorithm is presented for evaluating priorities of tasks based on utility coefficient matrices and vectors of importance for each task in the form of diagonal matrices showing utility values. A procedure is given for the computer center for the evaluation of the importance of programs which are graded according to the required memory or other computational requirements. The aggregate of programs is partitioned into classes with different priorities. A criterion is developed for evaluating the quality of the evolved plans for the processing of tasks of various types. For each plan the load of the computer equipment is estimated and a criterion formulated in vector form. The algorithm can be applied flexibly to large-scale plants with various types of computer equipment and can take into account requests from various levels of the enterprise.
[371-12497]

UDC 331.015.11

COMPUTERIZED SYSTEM FOR ANALYZING PSYCHOPHYSIOLOGICAL EXPERIMENTAL DATA

Kiev KIBERNETIKA I VYCHISLITELNAYA TEKHNIKA No 66 MEDITSINSKAYA KIBERNETIKA 1985 (signed to press 12 May 85) (manuscript received 13 Oct 83) pp 65-69

AFANASENKO, N. Ye. and PARAMONOV, Yu. B., Institute of Cybernetics imeni V. N. Glushkov, Ukrainian SSR Academy of Sciences

[Abstract] A computerized data acquisition and processing system is described for analyzing psychophysiological experimental data. The system is based on a YeS-1022 computer, which is capable of analyzing experimental material within a few hours. The structure and composition of the system are determined by the stream of system variables and psychophysiological information. The signals from standard recording equipment are input to the computer portion of the system, which is made up of analog-digital and digital-analog

converters, software and hardware interfaces, and the computer plus required peripheral devices. The system requires 256 kbytes of random access memory, 5 megabytes of disc memory, a standard tape drive, and a high speed multiplex channel, plus a graph plotter for output. The use of the system to analyze data from respiration experiments is described. Figures 2, references: 8 Russian.
[26-6900]

UDC 621.39:61

INFORMATION SYSTEM FOR SYSTEMS ANALYSIS OF MEDICAL DATA

Kiev KIBERNETIKA I VYCHISLITELNAYA TEKHNIKA No. 66 MEDITSINSKAYA KIBERNETIKA 1985 (signed to press 12 May 85), (manuscript received 12 Jan 84) pp 34-38

VOROB'YEV, F. P., MANUYLOVA, A. M. and BALAKA, L. A., Khar'kov Polytechnical Institute

[Abstract] A structural-functional approach to the construction of information systems is proposed that employs a systems approach in which the efficiency of the structure of the system is estimated with allowance for levels. An information management system for the treatment process that demonstrates the approach is described. Morphological (structural) information, and functional descriptions of the system have been developed. The system has been implemented on a YeS-1033 computer and can provide answers to various questions, compute the informativeness of symptoms, provide diagnoses, and prognose the condition of the patient. The system makes it possible to accumulate information considering this knowledge and to identify the best conditions and strategy. Tables 1, references: 6 Russian.
[26-6900]

UDC 331.015.11

MODELING OF FUNCTIONAL SYSTEM OF HUMAN-OPERATOR ACTIVITY

Kiev KIBERNETIKA I VYCHISLITELNAYA TEKHNIKA No. 66 MEDITSINSKAYA KIBERNETIKA 1985 (signed to press 12 May 85), (manuscript received 30 Oct 83) pp 90-94

NIKITIN, A. N., Institute of Cybernetics imeni V. N. Glushkov, Ukrainian SSR Academy of Sciences

[Abstract] The formal relationship between external and internal stimuli (factors) affecting a human operator and his purposeful psychophysiological responses that are formed in the process of psychic activity are examined. The objective is to construct a model of some system or dynamic organization that would indicate the way in which psychophysiological responses are formed during human activity as a function of the resources and external stimuli of the organism and its psychic structure. The systems approach to

the functional psychic activity system makes it possible to analyze such properties as functional structure, development dynamics, hierarchical structure, multiplicity of levels, purposefulness, capabilities, and style. The proposed model makes it possible to systematize accumulated experimental material, and to predict new aspects of the mechanisms underlying the regulation of human operator activity. References: 10 Russian.
[26-6900]

UDC 621.395.4

# CONSTRUCTION PRINCIPLES OF PCM DATA TRANSMISSION SYSTEMS

Moscow AVTOMATIKA, TELEMEKHANIKA, I SVYAZ in Russian, No 8, Aug 85 pp 4-7

SHMYTINSKIJ, V.V., Senior Scientific Worker, Leningrad Scientific Research Institute for Rail Transport

[Abstract] This study presents a review of the hierarchical system of PCM [pulse-code modulation] transmission systems designated IKM. The primary IKM-30 system is designed for multiplexing multi-pair audio frequency tables using municipal networks and single-quad cables in rural networks, and is also employed for analog-digital conversion in transmission systems at higher levels in the hierarchy. The secondary IKM-120 system is employed in local and internal zone network up to 600 km long and employs multiplexed balanced RF cables. The IKM-480 and IKM-1920 systems are used to provide greater numbers of channels on trunk routes. A description is provided of the equipment used to form and receive the digital signal, as well as the line circuit equipment. The basic parameters of the IKF-15-30-120, and -480 systems are tabulated. Figures 7, tables 2, references: 5 Russian.
[440-6900]

UDC 621.391.15

# NONBINARY CODES CORRECTING SYMBOL INSERTIONS, LOSSES AND REPLACEMENTS

Moscow PROBLEMY PEREDACHI INFORMATSII in Russian No 1, Jan-Mar 85 (manuscript received after revision 23 Nov 83) pp 35-39

DOLGOPOLOV, A.S.

[Abstract] Of great interest are maximally powerful correction codes for alphabets with a number of symbols on the order of dozens where the code is less than the size of the alphabet. A method is presented for constructing a short code of a nonbinary type which corrects single symmetrical insertions, losses and requirements. Over the field GF(q), i.e., the full alphabet, vectors are considered such that for short lengths a subset z does not contain errors. The subset satisfies the requirement that the insertion of any sumbol in any interval plus the loss in any other position will not produce any possible code word. Code length as a decisive factor in code power is considered analytically and models were computer processed for code word lengths of 3-6 words with results which confirmed the method formulation. [374-12497]

SYNOPSES FROM COMPUTER TECHNOLOGY OF THE SOCIALIST COUNTRIES, VOL 17, 1985

Moscow VYCHISLITEL'NAYA TEKHNIKA SOTSIALISTICHESKIKH STRAN in Russian
Vol 17, 1985

[Synopses of articles from the biyearly volume "Computer Technology of the Socialist Countries, Finansy i statistika, edited by I. A. Danil'chenko]

TRANSFORMATION OF MULTIUSER COMPUTER CENTERS INTO A NATIONAL COMPUTER NETWORK

[Synopsis of article by D. Mayteni, p 3]

[Text] Basic principles of governmental program for the development of a multiuser computer center network in the Hungarian Peoples Republic are considered. The ways of services development of these computer centers, hardware development used by these computer centers, and software development, as well as the basic ways of transformation of multiuser computer centers into a national computer network of the HPR are shown.

MULTIUSER COMPUTER CENTERS--A BASE FOR DEVELOPMENT OF THE UNIFIED SYSTEM FOR SOCIAL INFORMATION IN THE PEOPLES REPUBLIC OF BULGARIA

[Synopsis of article by S. Dimitrov and Yu. Antanasov, p 8]

[Text] The necessity to use a multiuser computer center as a basic component for the Unified System for Social Information in the PRB is justified. Hardware structure of a territorial multiuser computer centers, software used in these centers, as well as components for subscriber network, special features for their technical realization at the present time, and development prospects are shown. 1 ill.

THROUGHPUT PARAMETERS OF A TELEPROCESSOR

[Synopsis of article by V. I. Utkin, p 12]

[Text] The basic parameters of teleprocessors--its throughput capability in two aspects is considered: as the highest throughput capability and as the effective throughput capability. Basic functions of a teleprocessor used in a teleprocessing network, as well as requirements to the teleprocessor resources, necessary for a given rate of control functions realization processing and transmission of data are described. Formulas, determining the both throughput indices, as well as methods of their value control during testing are given. 2 ill.

DEVELOPMENT EXPERIENCE AND PROSPECTS OF A DATA TELEPROCESSING NETWORK FOR A RESEARCH INSTITUTE

[Synopsis of article by G. P. Lopato, N. K. Karachun and I. M. Vasyliev, p 20]

[Text] Computer aided solution of problems at a research institute is presented. It is shown that the effective use of computers is possible within the development of a research institute's teleprocessing network. Physical and logical structure of a functioning network hardware and its servicing are given. The ways for achievement of the network's higher effectiveness and direction of its future development are considered. 2 ill.

CONCEPTION OF APPLICATION AND REALIZATION OF HETEROGENEOUS LOCAL COMPUTER NETWORK

[Synopsis of article by K. Garbe, p 29]

[Text] Main areas of local computer network application, as well as hardware configuration of a computer center of the Dresden Higher Engineering College, which is intended for transformation into a heterogeneous computer network, are considered. Development stages, adopted interfaces, and interfacing facilities for various network levels are described. Services at the application level realized by the mentioned network are considered in detail. 2 ill.

FILE TRANSFER SERVICE--THE FIRST COMMERCIAL NETWORK SERVICE IN THE GERMAN DEMOCRATIC REPUBLIC PROVIDED BY THE VEB KOMBINAT «DATA PROCESSING»

[Synopsis of article by X. Ilze and P. Wiese, p 35]

[Text] The VEB Kombinat «Data Processing» is an enterprise providing computing services, and using for that purpose 16 large computer centers. Capacity of those computer centers represents 20% of computer installed base capacity in the GDR. Functions of one of the most important services--a file transfer service, which is based on the use of network file conception--are described. Classes of services are listed. Network configuration and network control aids are described. Operation experience of the file transfer service and development of the network are generalized.

CONTROL COMPLEX NEVA 1M--SWITCHING COMPUTER FOR QUASI ELECTRONIC AND AUTOMATIC EXCHANGES AND TOLL CENTERS AS WELL AS FOR AUTOMATIC SWITCHING NODES

[Synopsis of article by A. G. Kukhartschuk, L. Hermsdorf, p 42]

[Text] Basic functions of the Neva 1M complex and its structure, principles of structure components synchronization are described. Parameters and functional features of the complex' CPU, a peripheral processor, an external storage unit, an interfacing unit, as well as information on the complex software are given. 1 ill.

MEASUREMENT OF COMPUTER THROUGHPUT AND PERFORMANCE AT A MULTIUSER COMPUTER CENTER

[Synopsis of article by G. I. Novikov, and B. A. Timchenko, p 47]

[Text] System approach to the evaluation of a computer throughput under real operating load using a system of simple measures is suggested. The described aids for evaluation of functioning and measurement are based on the standard YeS hardware. The results of experimental operation of measurement methods with various YeS computers are given. 4 ill.

DEVELOPMENT OF THE YeS-1045 COMPUTER AND COMPLEXES BASED ON THIS COMPUTER

[Synopsis of article by A. T. Kuchukyan, T. E. Sarkisyan and V. A. Ter-Israyelyan, p 56]

[Text] Multisystem facilities as part of the YeS-1045 computer are considered. Structure of computer complexes based on the YeS-1045 computer with various levels of multicomputer operation is described. Complex' features are given, special features of their operation are shortly described.

APPLICATION PROGRAM PACKAGE DISCO-T FOR SOLUTION OF TRANSPORT TASKS

[Synopsis of article by G. Wildenhain, p 63]

[Text] Information on an application program package for solution of transportation tasks: a general task, a heterogeneous transport task, a task for transportation with way stations, a planning task for siting of objects is given. Data on solution time for various parameters using the YeS-1045 computer are suggested.

SOFTWARE SYSTEM FOR WORD PROCESSING TOS-83 ORIENTED ON THE SM-4 COMPUTER

[Synopsis of article by I. Fortunov, p 68]

[Text] The basic functional features of a word processing system oriented on minicomputer resources are given. The system forms the text automatically by lines and pages, makes margin justifying shifts, word breaking, dividing by capitals, divisions, subdivisions, can work with texts in Russian, English, Bulgarian languages.

MATHEMATICAL MODELING IN TESTING PROCESS FOR MANAGEMENT INFORMATION SYSTEM SOFTWARE

[Synopsis of article by G. Konopatskiy and K. Vorva, p 72]

[Text] Requirements to testing of complicated software products are considered. Survey of basic models for software reliability is given. Reliability parameters of high practical value are shown. Suggested by the authors the software reliability model which can be used in selection of testing strategy is described.

ON COMPARABLE TESTING OF GENERAL PURPOSE MATHEMATICAL PROGRAMS

[Synopsis of article by A. A. Kerge, R. M. Kerge, Yu. P. Pikk and A. F. Roose, p 78]

[Text] Scientific and methodological problems of software reliability evaluation while comparing new and existing software in the frame of centralized service organization are considered. Classification of software features is given. Evaluation of measured features on the example of mathematical general purpose programs using an interactive testing system intended for automation of routine procedures in running of test programs is given.

INTERACTIVE OPTIMIZATION PACKAGE

[Synopsis of article by V. V. Poll and R. E. Tyakht, p 85]

[Text] Special features of the package DIAMIN intended for absolute multimethod of local minimization of continuous functions of many variables, presented in general form or in the form of sum of the square of particular non-linear functions are described. The package is running under the operating system OS YeS with TSO and has in the mentioned version 7 subprograms for minimization. The package produced good results in solution of medium size tasks.

DEVELOPMENT SYSTEM OF DATA BASE MANAGEMENT SYSTEM FOR MINICOMPUTER DESIGN AND THE WAYS FOR RAISING ITS EFFECTIVENESS

[Synopsis of article by G. P. Ostapenko and A. L. Fridman, p 90]

[Text] The operating system DIAMS used for a data base for the SM computer systems design is described. Features of the system's input language, generation process, as well as the advantages of the mentioned system are considered. Information on further improvement of the system and some data on its application with automatic control systems are shown. 2 ill.

COMPUTER AIDED MANAGEMENT OF CATTLE-BREDING FARMS

[Synopsis of article by A. Matai, p 96]

[Text] Features of a cattle-breeding farm technology from the point of view of automatic control system are considered. Requirements to the system and particularities of control tacks, solved by the system are formulated. The ways of the system improvement and possibility of a minicomputer use in the system are shown; this permits to use the system at small enterprises.

TERRITORIAL MULTIUSER COMPUTER CENTER BASED ON THE VEB «DATA PROCESSING CENTER» IN MAGDEBURG

[Synopsis of article by T. Norte and A. Kautz, p 101]

[Text] The general strategy of the VEB «Data Processing Center» activities is formulated. The activities in improving remote data processing technology, used for a computer network design, is described.

MULTIUSE OF COMPUTER CENTER IN BANKING

[Synopsis of article by G. Gampe, p 105]

[Text] A remote data processing system for use in banking is submitted. Factors defining features and structure of the system are listed; three levels of the system are described; performance data and examples of tasks for users of three groups are given. 5 ill.

INTERACTIVE INFORMATION SYSTEMS FOR AUTOMATIC CONTROL SYSTEMS

[Synopsis of article by B. Esher and P. Strychek, p 111]

[Text] A software and hardware system for design of automatic control systems mainly using an interactive mode is described. Detailed information on the special system software, which includes a communication service system, automatic programming aids, aids for use of data base, application programs for planning is given. Experience in the system operation in three GDR ministries is generalized.

EXPERIENCE IN COMPUTER NETWORK OPERATION

[Synopsis of article by H. Shtal and N. Vulst, p 116]

[Text] Problems and their solution by establishing a computer network for the Academy of Science and Universities in the GDR are considered. The packet switching system is used by the network for intercomputer communications. Network software is divided into components for transmissions and communications; the network assignment and features of services are considered by the authors.

SOME REQUIREMENTS TO INTERACTIVE AUTOMATIC CONTROL SYSTEMS AND ONE OF THE EFFECTIVE METHODS OF REALIZATION OF SUCH SYSTEMS

[Synopsis of article by T. Vidor, p 122]

[Text] Problems of design and programmming of interactive ASU based on the KAMA system are considered. Practical recommendations for design of effective transaction programs taking into consideration two important requirements--high speed task solution and user friendliness--are given. An effective program structure for realization of interactive transactions is suggested.

AUTOMATIC SYSTEM FOR DISPATCHING CONTROL OF PRODUCTION

[Synopsis of article by N. Podarev, D. Stankova, B. Botev, B. Ralchevskiy and N. Dimitrova, p 128]

[Text] Problem-oriented complex POC DISPRO--a complex of software, hardware, and procedures--used for automatic control of an engineering enterprise is described. POC includes following sections: «production», «stock-room», «industrial production equipment», «attendance records» etc. and is based on YeS and SM hardware. POC's information files and output documents are described.

USE OF COMPUTER SM-1626 FOR CHILDBIRTH PROCESS OBSERVATION

[Synopsis of article by K. Yan and R. Leman, p 132]

[Text] A system based on a microcomputer and intended for observation a condition of a woman in childbirth and a new born child in delivery process is described. The system supervises basic parameters of delivery process, records them, and in the case of dangerous deviations generates a warning signal.

A SYSTEM FOR PLANNING OF COMPUTING PROCESS AT MULTIUSER COMPUTER CENTER

[Synopsis of article by N. Vass, p 136]

[Text] Problems of planning the activities for certain segments of a computer center are considered. A mathematical model for computing process planning of a multiuser computer center and its realization using a linear programming system is suggested. The experience in operation of the suggested method at the multiuser computer and its realization using a linear programming system is suggested. The experience in operation of the suggested method at the multiuser computer center in the Hungarian Peoples Republic is generalized.

PRICE INFLUENCE ON MULTIUSER COMPUTER CENTER SERVICES AND EFFECTIVESS OF USE OF ITS COMPUTING RESOURCES

[Synopsis of article by B. B. Sodell, p 140]

[Text] Problems of pricing of services provided by a multiuser computer center are considered. The formulas for service pricing and in particular pricing of processor time in batch processing are given. The suggested pricing method enhances all commercial indices of the computer center in the case of increased requests for data processing, i.e. promotes of intensive use of computer resources, 2 ill.

PROGRAM PACKAGE FOR ESTIMATING OF LABOUR PRODUCTION AND WAGES FOR OPERATORS IN GROUP DATA PREPARATION COMPLEXES

[Synopsis of article by P. Ikhrig, p 149]

[Text] Application program package MHEFIX for calculation of operator productivity in group data preparation complexes is described. The system stimulates maximum operator output with maximum use of office time. The system permits real planning of operators full-time job and keeps running data preparation complex at full capacity, as well as providing an analyses of calculated operator time.

CONTRACTS FOR DOMESTIC TRADE DATA PROCESSING IN HUNGARY

[Synopsis of article by Z. Andyal, p 153]

[Text] Procedure for contract relations between a multiuser computer center and users in domestic trade system is described. Contract forms are given, all types of services provided by the multiuser computer center are considered.

MODEL DESIGN OF MULTIUSER COMPUTER CENTER

[Synopsis of article by V. N. Kvasnitskiy, p 160]

[Text] The author looks at the problem of procedures of a multiuser computer center design based on model structure of project. Main body of each structure are model designs; the necessary adaptation to the concrete system subscribers and tasks to be solved is carried out through the change of component features. Model design and features of all components are described. Information on multiuser computer centers designed on the base of model design is given.

ECONOMICAL AND MATHEMATICAL MODELS OF MODES FOR REHABILITATION OF QUALIFICATION FOR COMPUTER OPERATION PERSONNEL

[Synopsis of article by E. A. Karapetyan, p 168]

[Text] The article is concerned with an approach to determinating of optimal mode for supporting the qualification and the terms for retraining of computer operation personnel for complex systems.

NUMATH--THE NEW APPLICATION PROGRAM PACKAGE FOR NUMERICAL MATHEMATICS FROM THE GDR

[Synopsis of article by M. Sikor, p 174]

[Text] An application program package intended for YeS computers and containing model subprograms of numerical mathematics: linear algebra, approximations, interpolations, and differentiations of functions, solution of non-linear equations, and non-linear equation systems, minimization of functions of one or several variables etc. is described. The package structure and its possibilities when used as a part of the array module of the YeS-1055 computer is described.

THE DISC STORAGE UNIT SM-5411

[Synopsis of article by P. Khensel, p 175]

[Text] Special features of the disk storage unit SM-5411, with fixed medium and moving heads are given. The Winchester type disk storage provides high reliability. There are several modifications with capacity from 16 to 40 M bytes. The disk storage unit is designed as a module with height of 265 mm and which is mounted in the standard SM frame.

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